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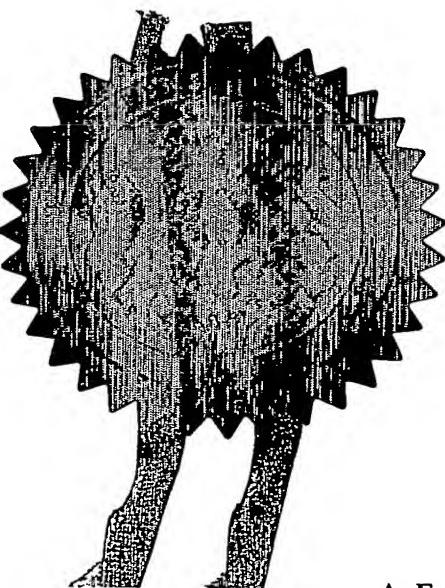
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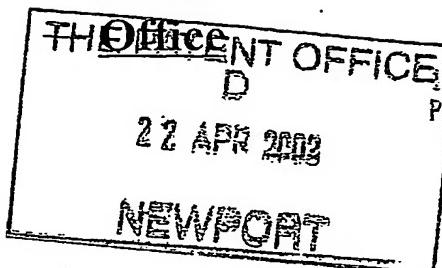
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Dated 19 April 2004

Stephen Hordley

The
Patent

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2. Patent application number

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3. Full name, address and postcode of the or of each applicant (underline all surnames)

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22 APR 2003

861 S262C01

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its corporation

4 Title of the invention

HAND UTILITY INTERFACE

5 Name of your agent (if you have one)

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7497928002

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Country

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Number of earlier application

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Description 17

Claim(s) 1

Abstract 1

Drawing(s) 3

8
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Priority Documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77) 1

Request for preliminary examination and search (Patent Form 9/77)

Request for substantive examination (Patent Form 10/77)

Any other documents
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11.

I/We request the grant of a patent on the basis of this application

N L R

Signature Christopher Gerard Pike
AGENT FOR THE APPLICANTS

17 April 2003

12. Name and daytime telephone number of person to contact in the United Kingdom

Dr. Christopher G. Pike
01628 471869

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Hand-utility interface

Technical Field

The present invention relates to a hand-utility interface that is wearable on the hand of a user. In particular, the present invention relates to a foamed block for receipt of utility or tool attachments, especially attachments suitable for use in cleaning and grooming applications.

Background to the Invention

Most of the cleaning tools presently available rely on a user directly holding an independent interface, such as handle of the common bristle brush. In such cases, the user's hand is unprotected whilst conducting the task. Additionally, much of the innate dexterity of the user's hand, in particular, the user's fingers, is lost.

It is an object of the present invention to provide a wearable hand-utility interface, which protects the hand of a user during the undertaking of various utility tasks (e.g., cleaning, grooming).

It is another object of the present invention to provide such a wearable hand-utility interface, which affords the user more of the dexterity of the user's hand, such that the interface can form itself to meet any surface, regardless of its complexity.

It is a further object of the present invention to provide a hand-utility interface, which allows the hand to be clenched, for example, for wringing out liquid from the interface, without causing discomfort to the wearer.

It is a still further object of the invention to provide a hand-utility interface, which is adaptable for use with different sizes of hand and different lengths of finger.

Summary of the Invention

According to one aspect of the present invention there is provided a hand-utility interface for use in protecting a user's hand during utility tasks comprising a foamed block body having a plurality of finger-receiving channels defined therein; and palm support means for securing said interface to the palm of a user's hand, wherein the finger-receiving channels snugly receive the fingers of said user's hand such that in use, the palm support means and finger-receiving channels secure the interface to the user's hand.

The term 'hand-utility interface' (or simply 'interface') herein is used to mean a wearable block body form device or apparatus, which protects at least part of the hand of a user during the undertaking of various utility tasks (e.g. cleaning, grooming). The 'interface' provides an interface between the user's hand and the utility media, which in aspects comprises a utility tool or utility consumable (e.g. cleaning or polishing media) for use in performing a utility task.

In aspects, the hand-utility interface is designed to afford maximum comfort to the hand whilst maximising the work area covered by the hand and the efficiency of the cleaning task.

Suitably, the hand-utility interface is adaptable for use with user's hands of varying sizes.

Typically, the interface acts to at least, part-enclose the user's hand (i.e. at least part of the hand and fingers are not enclosable thereby).

Preferably, the hand-utility interface in use, covers the users' fingers and at least part of the user's palm but leaves the top part of the user's hand and fingers uncovered.

This embodiment provides enhanced user utility in terms of ease of hand and finger movements.

In one aspect, the hand-utility interface is designed such that it covers only that part of the palm that can be comfortably reached by the fingers. When the interface comprises absorbent media, this provides the function that the interface can be efficiently wrung out by a simple clenching of the fist.

In embodiments, the hand-utility interface herein is also shaped to be put on by the user in a one-handed operation that enhances ease and speed of user "pick up". This contrasts with the operation to put on most traditional gloves, which is a two handed operation.

The hand-utility interface comprises a block form body. The body has essentially two functions. Firstly, it provides a degree of protection to the user's hand whilst conducting utility tasks. Secondly it provides a support for the application of utility media by the hand.

Suitably, the body provides a support for suitable utility media, but flexes to allow movement of the hand.

Preferably, the body is shaped to provide a uniform, e.g. flat work surface (i.e. utility surface) that typically takes the form of a continuous pad in use, locating under the hand of the user. This contrasts with the non-uniform, rounded form, work surface provided by the un-gloved palm and underside of fingers of a user's hand.

The body is generally comprised of a foamed or sponge-like material. The material suitably comprises a synthetic polymer material that has a foamed structure (i.e. comprising foamed bubble features). In essence, suitable foam materials are those that offer the characteristics of 'sponge' such as its natural give and crushability, resilience and ability to absorb and carry liquid media. Suitable materials include

'open foam', where the individual bubbles are incomplete spheres, and 'closed foam', where the spheres are complete, this latter type having considerably less water absorption ability.

The body has a block form. That is to say, overall it has a generally block-like three-dimensional form. The body has plural (generally, four) finger-receiving channels defined therein. The finger-receiving channels may be provided to the block form body in any suitable manner including cutting out the channels or by injection-moulding the form of the body with the finger-receiving channels defined therein.

The surface of the body that in use, contacts the palm of the user might be flat, or it might be domed better to locate it under the hand for added user comfort.

Suitably the body is also shaped such that in a line, more or less ahead of the second finger-receiving channel (i.e. that channel that in use, receives the second finger of a user), the form of the body produces a soft 90 degree angle, the lines of which are interrupted by the finger tip protecting ends of the body for the index and third fingers. The purpose is to produce a form that is good at getting into corners, for example where the wipe being used is for window cleaning. In use, the finger tip protecting ends of the body for the index and third fingers are suitably arranged to crush down, so providing, for example, a good form for sweeping a window frame immediately adjacent to the glass.

Depending upon the nature of the selected body, the perimeter (plan view) of the interface may extend out to produce a surface considerably bigger than the hand. To do this and allow that the extreme of the perimeter has sufficient inherent strength to perform useful work may require a more rigid/stiffer foam type.

Each finger-receiving channel is sized and shaped to snugly receive a finger of a user. The snug receipt is assisted by the resilience characteristics of the material comprising the body, which mean that the walls of each finger-receiving channel

tend to give as the finger is inserted and naturally adapt to any further finger movement to maintain snug finger-receipt.

Each finger-receiving channel defines opposing side walls to at least partially encase a snugly-received finger. It will be appreciated that the side walls also act to divide each finger-receiving channel off from its adjacent neighbour(s). The side walls may provide a finger support function, as a result of their resilient character. The sidewalls may however, also enable (and e.g. be shaped for) in use, grip by the fingers of the user. Thus, for example for any two adjacent finger-receiving channels (e.g. between the first and second, second and third or third and fourth fingers) the user may apply gripping force between his /her relevant fingers to the divider wall between the adjacent finger-receiving channels thereby gripping onto that divider wall.

The finger channels in general, have an elongate 'U' shape. In one, the finger channels are tapered along the channel. This tapering form is designed to assist user insertion of his/her fingers into each channel. In another aspect, the uppermost portion of the 'U' shaped channels closes in a little, better to close over the top part of the finger.

In general terms, the walls of the finger channels need to be sufficiently high that the fingers of the small, ladies hand are completely concealed in side elevation. The wall height is generally also sufficient that at least two thirds of the big male finger depth is concealed in side elevation.

Suitably, the hand-utility interface herein is arranged to cooperate with those elements common to all sizes of user hands. It is suitably configured to offer a fit for the majority (e.g. 90%+) of all adult hand sizes. Traditional glove forms account for this variable by offering different sizes of product or by use of stretch fabrics, whereas the present interface does so by providing means for securing the interface to a user's hand.

The means for securing the interface to a user's hand comprise palm support means for securing said interface to the palm of a user's hand and the finger-receiving channels for snugly receiving the fingers of the user's hand. In use, the palm support means and finger-receiving channels act in combination to secure the interface to the user's hand.

The palm support means herein functions to support the body (e.g. palm-protecting part) of the interface and to retain it firmly against the underside of the user's hand. Suitably, the palm support means secures the body of the interface to the base of the fingers and/or the palm of the user's hand.

Suitably, the palm support means takes the form of one or more resilient yokes. The yokes are shaped for receipt at the junction between the fingers of a user (i.e. at the junction of either the first and second, second and third, or third and fourth fingers).

Suitably, the yokes are shaped to cooperate with the natural taper common to all hands. The resilient nature of the yoke once again affords the glove to accommodate and adjust to various hand sizes.

Suitably, the one or more yokes have a T-form. In particular, each yoke comprises a vertical trunk with horizontally extended arms and legs. In use, the T-form yoke fits between a user's adjacent fingers.

In one aspect, each yoke comprises two pairs of independent arms, each pair mounted on a corresponding vertical trunk. This configuration allows even greater freedom of movement.

Suitably, in use with a large hand the vertical trunk of the yoke sits forward of the junction of finger and palm of a large hand, so that in use, the shorter fingers of a smaller hand may reach the end of the finger-receiving channels.

In one aspect, the portion of the yoke that is secured to the 'palm piece' part of the body, is set back, relatively close to the wrist. This is done to provide that the palm piece itself is given its support as central to its weight as is possible, without allowing that these lowest portions of the yokes might be uncomfortable to the small hand when crushing the form so as to wring it out.

Preferably, the glove comprises two or three resilient palm support members (e.g. yokes), each of which may comprise pairs of independent arms.

In aspects, the resilient finger and/or palm support means are made from sprung steel wire or moulded (e.g. injection moulded) plastics or skinned foam.

Optionally, the interface is provided with an ancillary interface such as in the form of a flexible backing sheet. This ancillary interface may be shaped and sized such as to enhance the coverage of the user's hand. The ancillary interface may also be provided with attachment means (e.g. in the form of snap-fit contourings) for attachment to the glove.

Suitably, the interface additionally comprises means to receive one or more utility attachments. As used herein, the term "utility attachments" refers to attachments having a useful function. For example, the utility attachments may take the form of tools for any useful purpose.

Suitable purposes include cleaning, washing and use in household tasks; DIY purposes including sanding, painting, shaping and forming; medical purposes; patient care purposes such as bed bathing; automotive car care including washing, polishing, leathering and interior cleaning; health and beauty purposes such as exfoliation, massage, application of oils/lotions; gardening purposes such as house plant leaf cleaning/treatment; shoe and boot polishing; window cleaning; grooming of humans and of animals. Indeed, the interface may find utility in pretty much any and every task managed by hand.

The utility attachments may either be permanently attached to the interface or reversibly receivable by the interface. For example, the interface and utility attachment may be formed as cooperating elements, the utility attachment being interchangeable and or replaceable.

The means to receive utility attachments may comprise one or more circular recesses. These may provide the means to locate cleaning media and provide the home, for example, for bristle bunches.

Suitably, the means to receive utility attachments may comprise at least one female socket for receiving a male counterpart situated on a utility attachment.

The means to receive utility attachments are typically positioned at the underside of the block form body.

In one aspect, the releasable attachment of the utility attachment (e.g. in the form of a cloth wipe) to the body is as follows:

The periphery of the cloth wipe (e.g. shaped to cooperate with the body form) is printed with wax, or some other water repellent, to produce a flat non-cloth surface, and the cooperating periphery of the body is printed with "post-it note" (trade mark) type low tack adhesive.

Further, the wax printing on the wipe may be arranged to give it a degree of resilience / form-ability. This enables stamp forming of the wipe to give it an up-turned edge, so to reduce the danger of it getting caught and ripped off in use in the work situation. The up-turn is typically no more than 30 degrees, because of the need to stack the wipes. The printing/stamping may in aspects, be combined with the die cutting operation, to make it a one hit process.

As an alternative, "paper engineering" may be used as a means of fixing wipe to the body, such as of the type used in disposable nappy fixings. In aspects, the standard wipe fabric can be roughed up on one side to produce attachment loops for attachment to suitable hooks on the periphery of the underside of the body.

As a further alternative, static electricity may be employed as a temporary fixing means.

The utility attachments may take the form of bristles, spines, hooks, hair, sponge, leather, fabric pads, scourers, abrasives or wire wool.

The utility attachments may also comprise vacuum elements. In one vacuum aspect, a resilient 'fish-tail' nozzle attaches to the under side of the interface. Leading therefrom a very light weight hose goes back, under the wrist and is supported mid way between wrist and elbow by a loop or hook form which goes over the arm. Suitably, a flexible membrane covers the underside of the body. Further, this flexible membrane extends to provide a "skirt" positioned outside the bristles, running around the outside of the palm and up the outside of the index and little finger, once again preventing loss of suction and promoting that the vacuum is available under the finger tip bristles. The bristle part of this particular tool is in the form of a flexible membrane with bristles lining the side of each finger and surrounding the underside of the glove. The vacuum then draws down the bristle "avenue" underneath each finger, and generally around the palm.

In another aspect, the interface incorporates means for using liquids and gasses as "tools", both flowing out through and being drawn in through attachable media. A reservoir for dispensing such gasses and or liquids may be additionally incorporated as an integral or separate, but connected, feature of the claimed invention.

In one embodiment, the utility attachments are permanently attached to the interface.

In another embodiment, the utility attachments are removable and/or exchangeable.

The utility attachment is particularly suitable for use with wipes (e.g. cloth-form). The wipes may be comprised of any suitable woven or non-woven material of either natural or synthetic origin. The wipes may be used for a variety of purposes including the picking up of detritus (e.g. crumbs) from a kitchen work surface; other household uses including disinfecting; cleaning and polishing; mother and baby hygiene; hospital uses including patient hygiene and pre-operation preparation; veterinary uses including animal care in general; automotive uses such as cleaning and polishing.

Wipes are commonly provided with a chemical formula that rapidly evaporates. In their current form, i.e. in use under the hand, the wipe is free to 'breath' from its upper surface, accordingly its life span and performance are needlessly reduced. In aspects, the upper surface of the wipe is provided with a waterproof membrane, so that it can't breath that way, and its in-use lifetime is improved. One approach to achieving this, is to give the wipe a fixed membrane. The other approach is to give the hand-utility interface herein, a fixed membrane. The advantage of the latter being that the cost is reduced to one membrane for any number of wipes. However, if both wipe and the hand-utility interface herein had such a membrane, it might be possible to use static electricity as an alternative means of securing wipe to the interface..

The wipe used under the hand, is pressed into action only by four narrow lines (the underside of the fingers), and the periphery of the palm, this is inefficient. The wipe applied by means of the hand-utility interface herein is evenly applied over the whole of its surface. Moreover, because of the interface's ability to adapt to irregular surfaces, the performance is greatly enhanced.

Current wipes unfold to be bigger than the hand and can dry out long before it is possible, evenly to apply all of its surface to a particular wiping. This is less so for a wipe applied by the interface herein.

Cuurent wipes used directly under the hand demands that the hands are then washed, not so when the wipes are used with the hand-utility interface herein.

The chemicals used in current wipes have to be appropriate for direct, constant contact with the skin, and so are limited in their aggressiveness, not so where the wipes are used with the hand-utility interface herein in that the interface protects the hand form chemical contact.

Because of its moisture and rapid evaporation, the current wipe is particularly cold to the touch, less so when the wipe is used with the hand-utility interface herein which is generally dry, and warm because of its foam insulation characteristics.

Current wipe forms are typically very thin and give the user's hand little protection from the impact of surfaces encountered, not so when used with the interface herein which provides a very comfortable barrier between the hand and whatever it meets. In particular it provides a buffer for each finger tip, to absorb impact to reduce the discomfort of "stabbing". By the same means it protects the finger nails.

In one aspect, the block form body is shaped to cooperate with a base station. Suitably, the base station is in this aspect provided shaped to receive the body such that, when the hand pushes the body into the base station, the interface is received in a 'parking' configuration.

In another aspect, the invention provides a kit of parts comprising a hand-utility interface as defined *supra* and a set of utility attachments as defined *supra*. Optionally, the kit of parts further comprises a base station for said interface.

Brief Description of the Drawings

The invention will now be described further with reference to the accompanying drawings, in which:-

Figure 1 shows a plan view of a hand-utility interface in combination with a wipe attachment in accord with one aspect of the present invention;

Figure 2 shows a plan view of a block form body for use with the interface of Figure 1 in the absence of palm support means; and

Figure 3 shows a plan view of a second hand-utility interface glove in accord with another aspect of the present invention.

Referring now to the drawings, Figure 1 illustrates a hand-utility interface herein 102 herein arranged to mate with a wipe attachment 150 therefor.

The interface 102 has block form body 110 injection-moulded from a polymeric foam material. The body 110 is shaped to receive in use, the palm and fingers of a user and is provided with a palm-receiving portion 112 having a gently domed surface to mirror the surface of a received user's palm and four elongate U-shaped finger-receiving channels 114a-d. The finger-receiving channels 114a-d may be seen to be defined by two outer walls 116a-b and three inner dividing walls 117a-c, which stand proud from the base 104 of the interface 102. The tip ends 118a,c-d of the index, third and fourth fingers of the body 110 may be seen to define a generally soft, rounded profile whereas that tip end 118b of the second (i.e. longest) finger has a generally 90° (right angled) profile. This form of profile eases the insertion of the second finger tip end 118b into corners for cleaning such as for example, where the interface is used for window cleaning. The finger tip ends 118a, 118c of the body 110 for the index and third fingers are suitably arranged to crush down, thereby providing an improved profile for sweeping a window frame immediately adjacent to the glass.

The body is further provided with resilient yokes 130a, 130b each comprising a bobbed end 132a, 132b. In use, the yokes 130a, 130b respectively bridge the node between a user's first and second, and third and fourth fingers, the bobbed end 132a-b engaging the top of the user's hand, such that the palm of the user's hand is retained adjacent to the palm-receiving portion 112 of the body 110.

In use, the finger channels 114a-d and the yokes 130a-b in combination, form the means to retain the interface on the user's hand. The user inserts a finger into each respective finger-receiving channel 114a-d where each finger is snugly received. The snug receipt is assisted by the resilience of the foam material comprising the body 110 which mean that the relevant walls 116a-b, 117a-c of each finger-receiving channel tend to give as a finger is inserted and naturally adapt to any further finger movement to maintain snug finger-receipt. In a usage operation, the user's fingers grip the divider walls 117a-c of the finger-receiving channels 114a-d, thereby retaining the finger-receiving part of the body 110 adjacent to the fingers.

Meanwhile, the yokes 130a, 130b engage the node between the user's first and second, and third and fourth fingers such as to retain the palm of the user's hand adjacent to the palm-receiving portion 112 of the body 110.

The independent flexing of each of the finger-receiving channel 114a-d and yoke elements 130a-b contributes to the ability of the glove to both protect the user's palm and fingers without hampering the movement of the user's hand and fingers.

The underside base 104 of the interface 102 has a uniform flat surface (not visible) which is shaped to receive a utility attachment in the form of a wipe 150. Suitable means (e.g. as described hereinbefore) may be provided to fix the wipe 150 to the base of the interface 102. The wipe 150 is suitably provided with cleaning media (e.g. detergent).

Figure 2 shows a plan view of the body 110 only of the interface 102 of Figure 1. Suitable dimensions of each element are indicated.

Figure 3 shows a variation of the interface 102 of Figure 1, which is identical in all aspects other than the form of the yokes 130a-b.

In more detail, the interface 202 has block form body 210 injection-moulded from a polymeric foam material. The body 210 is shaped to receive in use, the palm and fingers of a user and is provided with a palm-receiving portion 212 having a gently domed surface to mirror the surface of a received user's palm and four elongate U-shaped finger-receiving channels 214a-d. The finger-receiving channels 214a-d may be seen to be defined by two outer walls 216a-b and three inner dividing walls 217a-c, which stand proud from the base 204 of the interface 202. The tip ends 218a,c-d of the index, third and fourth fingers of the body 210 may be seen to define a generally soft, rounded profile whereas that tip end 218b of the second (i.e. longest) finger has a generally 90° (right angled) profile. This form of profile eases the insertion of the second finger tip end 218b into corners for cleaning.

The body is further provided with resilient yokes 230a, 230b each comprising a mushroomed end 232a, 232b. In use, the yokes 230a, 230b respectively bridge the node between a user's first and second; and third and fourth fingers, the mushroomed end 232a-b engaging the top of the user's hand, such that the palm of the user's hand is retained adjacent to the palm-receiving portion 212 of the body 210.

In use, the finger channels 214a-d and the yokes 230a-b in combination, form the means to retain the interface on the user's hand. The user inserts a finger into each respective finger-receiving channel 214a-d where each finger is snugly received. The snug receipt is assisted by the resilience of the foam material comprising the body 210 which mean that the relevant walls 216a-b, 217a-c of each finger-receiving channel tend to give as a finger is inserted and naturally adapt to any further finger

movement to maintain snug finger-receipt. In a usage operation, the user's fingers grip the divider walls 217a-c of the finger-receiving channels 214a-d, thereby retaining the finger-receiving part of the body 210 adjacent to the fingers.

Meanwhile, the 230a-b engage the node between the user's first and second, and third and fourth fingers such as to retain the palm of the user's hand adjacent to the palm-receiving portion 212 of the body 210.

The independent flexing of each of the finger-receiving channel 214a-d and yoke elements 230a-b contributes to the ability of the glove to both protect the user's palm and fingers without hampering the movement of the user's hand and fingers.

The underside base 204 of the interface 202 has a uniform flat surface (not visible) which is shaped to receive a utility attachment in the form of a wipe 250. Suitable means (e.g. as described hereinbefore) may be provided to fix the wipe 250 to the base of the interface 202. The wipe 250 is suitably provided with cleaning media (e.g. detergent).

In further aspects herein, the hand-utility interface is suitable for use with a self-disinfecting cloth or cloth with visual warning feature to show when disinfectant components thereof are exhausted. The cloth might be a permanent fixture attached to the interface, or it might be a replaceable feature. In either case, the interface will typically be provided vertical apertures in the finger channels and in the 'palm piece' part of the body, through which the "pockets" of disinfectant will be clearly visible before the hand is inserted.

In still further aspects herein there is provided a 'free breathing glove'. This is a full glove which is typically water proof and/or chemical proof and supported on the hand by an interface comprising finger tip grips and yokes. The advantage is that the upper skin of the glove need not touch the hand at all, and so a clear air passage can be provided to allow the hand to breath.

In developments of the 'free breathing glove' a natural bellows effect can be set up, so that articulation of the hand in work will automatically exchange the air thereby functioning as an 'excess heat dissipater'.

In still further aspects, the interface is adapted to have ambidextrous form. That is to say, a universal form where it is configured to work for either left or right hand.

In still further aspects, the interface is provided with a 'sure grip' feature. This enables the interface to function as a means of giving an operative a better grip on tools and the materials of work in general. This application can be provided in two forms: one is the format of the interface worn regularly as a glove type. The second is the interface being built into work tools, both powered and non powered.

In still further aspects, the interface is provided as a means of isolating the hand from the vibration of equipment in general. In a particular aspect, the interface is provided as a means of easing the pressures that contribute to repetitive stress injury (RSI).

In still further aspects, the interface is used to provide a perfect framework for the hand application of abrasive papers and such as the "Scotch Bright" (trade mark) type format. These abrasives may for example be used for the automotive, air craft, carpentry and DIY sectors.

It will be understood that the present disclosure is for the purpose of illustration only and the invention extends to modifications, variations and improvements thereto.

The application of which this description and claims form part may be used as a basis for priority in respect of any subsequent application. The claims of such subsequent application may be directed to any feature or combination of features described therein. They may take the form of product, method or use claims and

may include, by way of example and without limitation, one or more of the following claims:

Claims

1. A hand-utility interface for use in protecting a user's hand during utility tasks comprising a foamed block body having a plurality of finger-receiving channels defined therein; and palm support means for securing said interface to the palm of a user's hand, wherein the finger-receiving channels snugly receive the fingers of said user's hand such that in use, the palm support means and finger-receiving channels secure the interface to the user's hand.

Abstract

There is provided a hand-utility interface for use in protecting a user's hand during utility tasks. The interface comprises a foamed block body having a plurality of finger-receiving channels defined therein; and palm support means for securing said interface to the palm of a user's hand. The finger-receiving channels snugly receive the fingers of said user's hand such that in use, the palm support means and finger-receiving channels secure the interface to the user's hand. The interface may be used with various utility attachments including those in the form of wipes.

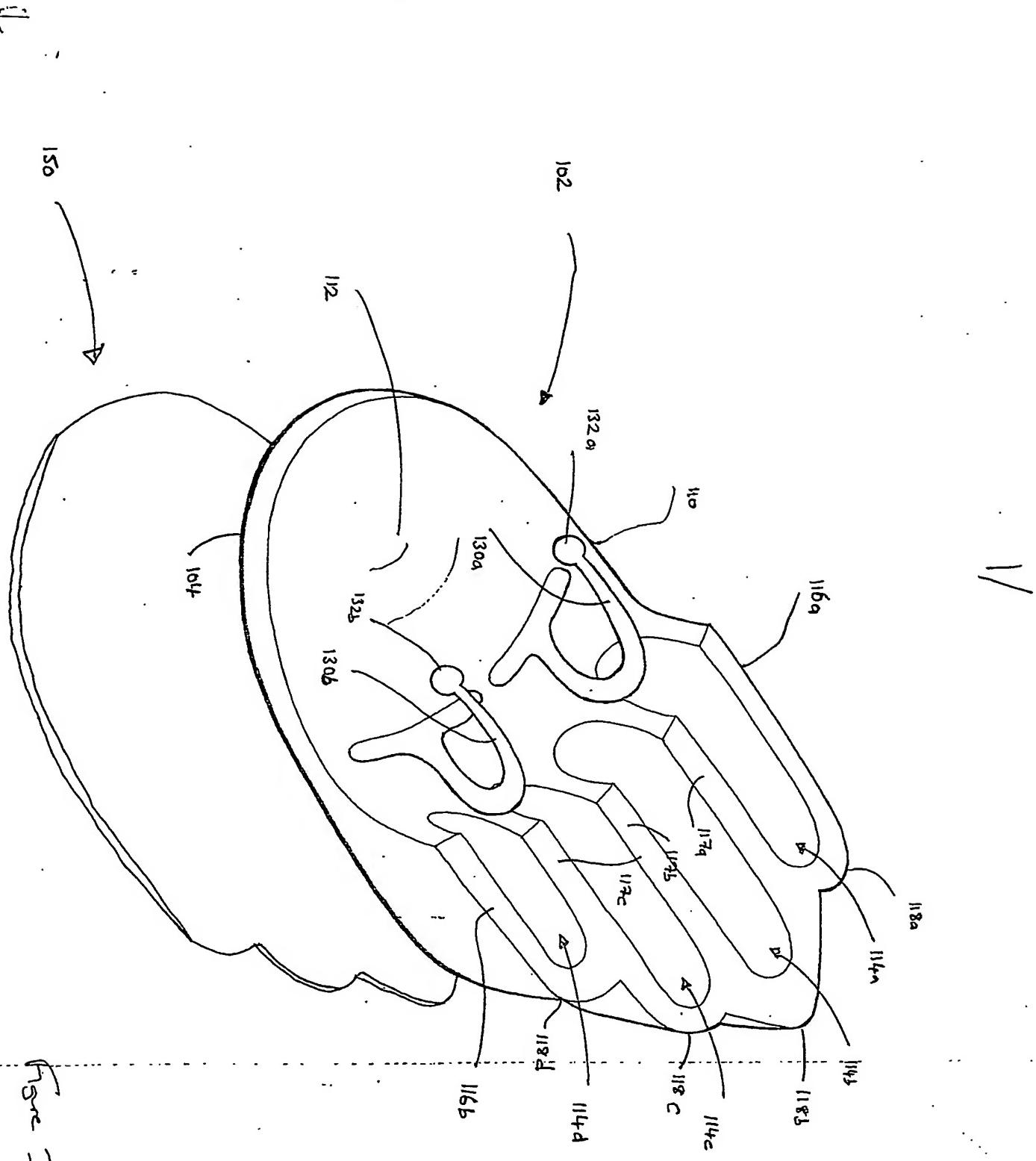


Figure 1

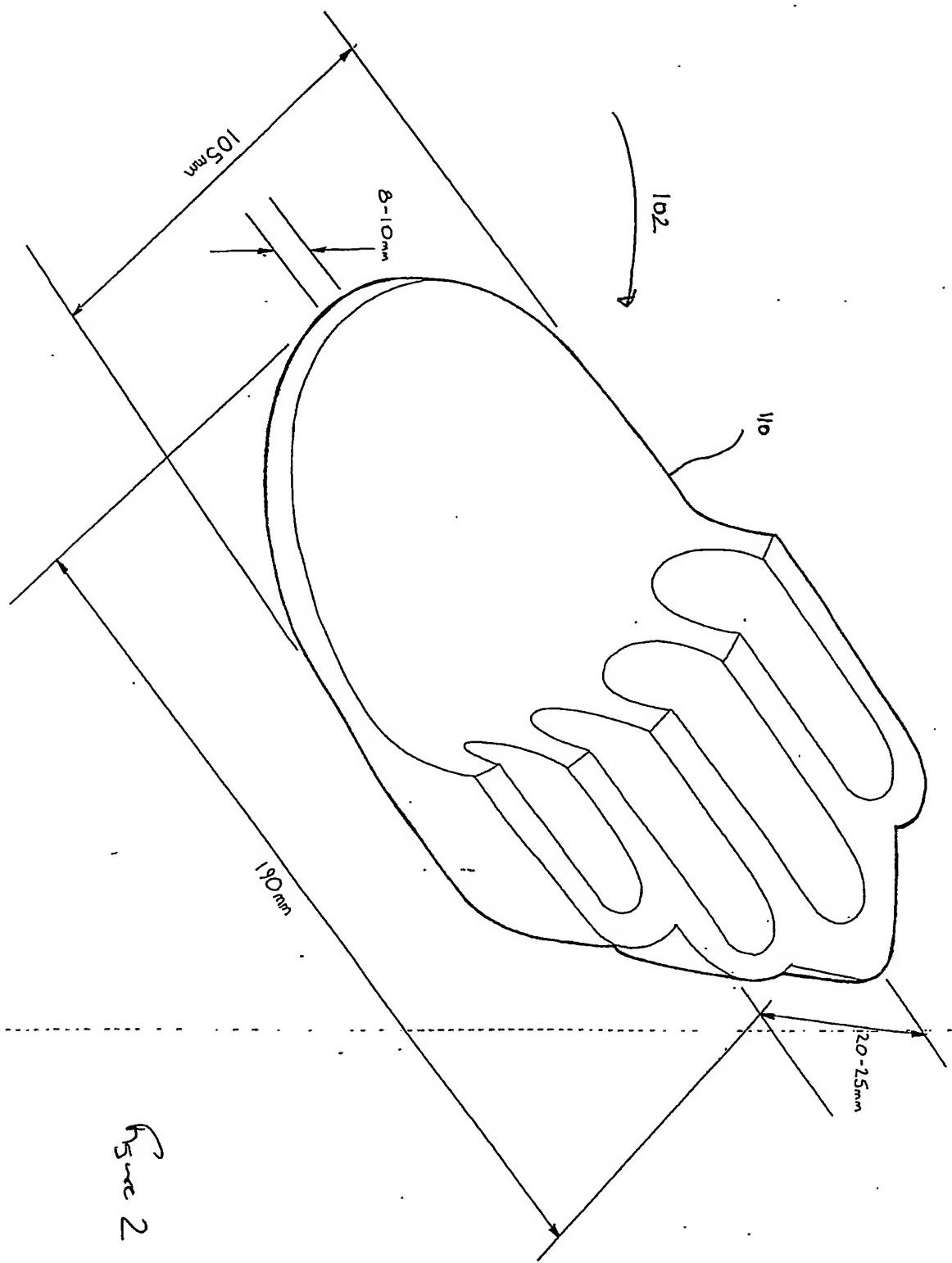
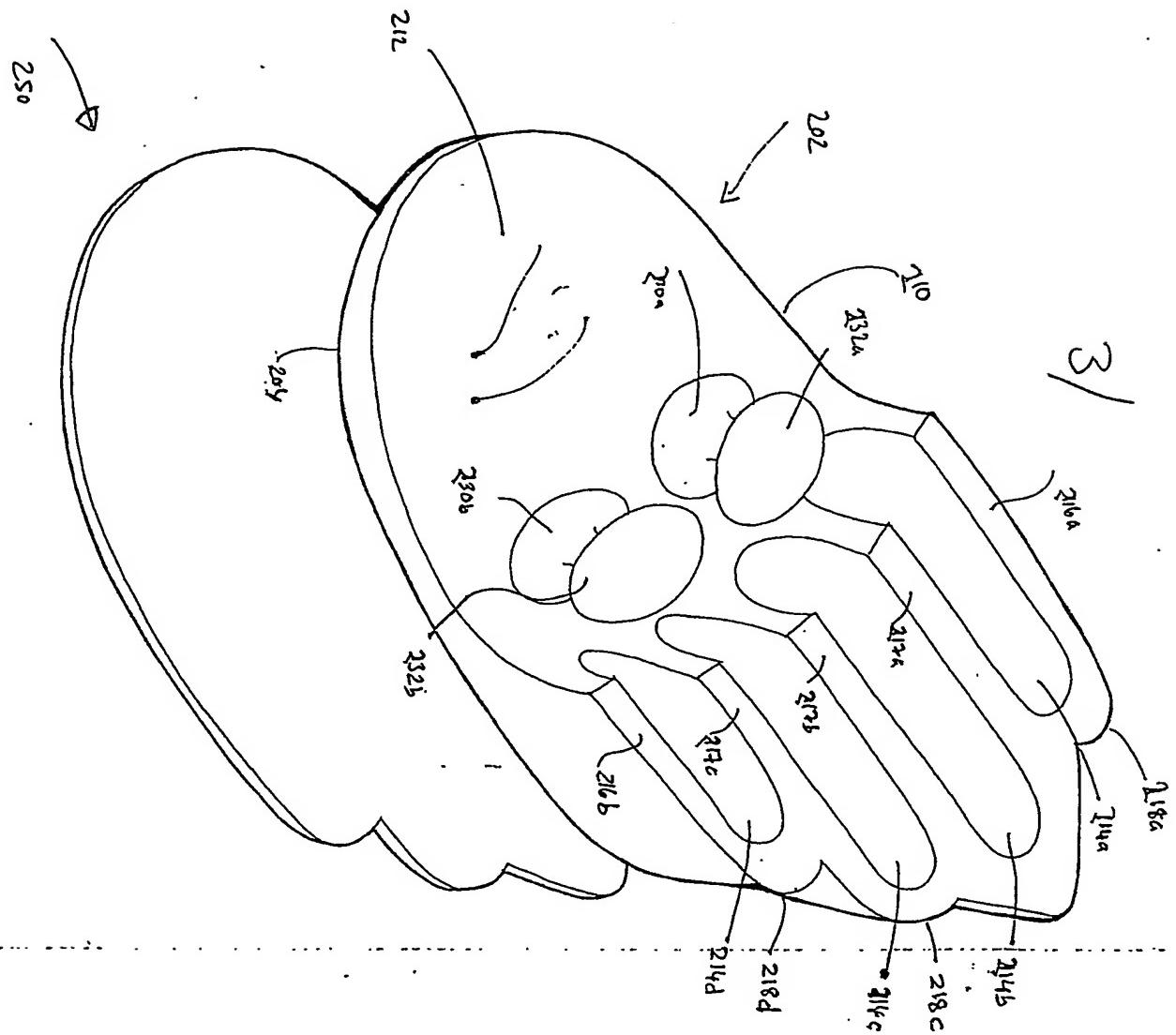


Figure 2



PCT/EP2004/004143



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